

10/13/16

"The biggest human temptation is to settle for too little" -Thomas Merton

HW: "Solving Radical Equations HW" #2-20 even
Test 2 on Wednesday 10/19

AIM: How do we solve Radical Equations?

Warm Up:

1) Factor completely: $4x^3 + 28x^2 - 9x - 63$

Usually means to factor more than once.

$$4x^2(x+7) \quad | \quad -9(x+7)$$
$$(x+7)(4x^2 - 9)$$
$$(x+7)(2x-3)(2x+3)$$

2) Simplify: $\frac{4x^6y^8 - 3x^8}{12x^3}$

An equation that contains at least one radical term with a variable in the radicand is called a **radical equation**. For example, $\sqrt{2x - 3} = 5$ is a radical equation. Since the radical is a square root, we can solve this equation by squaring both sides of the equation.

Solution:

$$\begin{aligned}\sqrt{2x - 3} &= 5 \\ (\sqrt{2x - 3})^2 &= 5^2 \\ 2x - 3 &= 25 \\ 2x &= 28 \\ x &= 14\end{aligned}$$

Check:

$$\begin{aligned}\sqrt{2x - 3} &= 5 \\ \sqrt{2(14) - 3} &\stackrel{?}{=} 5 \\ \sqrt{28 - 3} &\stackrel{?}{=} 5 \\ \sqrt{25} &\stackrel{?}{=} 5 \\ 5 &= 5 \checkmark\end{aligned}$$

⊗ Steps for solving radical equations:

1) Isolate the radical (If possible)

2) Perform the inverse operation to get rid of the radical.

Ex:

$$(\sqrt{\quad})^2 \quad \text{OR} \quad (\sqrt[3]{\quad})^3$$

3) Solve for the variable.

4) CHECK!!!

⊗ Recall:

$$\sqrt{36} = +6$$

$$-\sqrt{36} = -6$$

$$\pm\sqrt{36} = \pm 6$$

$\therefore \sqrt{x+2}$ is only answers that give us (+) results

Practice:

$$1) (\sqrt{x+6})^2 = (x)^2$$

$$x+6 = x^2$$

$$\begin{array}{r} x+6 \\ -x-6 \\ \hline 0 = x^2-x-6 \end{array}$$

$$0 = (x-3)(x+2)$$

$$\begin{array}{l|l} x-3=0 & x+2=0 \\ \hline x=3 & x=-2 \\ \checkmark & \text{reject} \end{array}$$

THINKING
 Isolate $\sqrt{\quad}$ ✓
 Inverse $(\sqrt{\quad})^2$ ✓
 Solve ✓
 CHECK ✓

Check:

$$x=3 \quad \sqrt{3+6} = 3$$

$$\sqrt{9} = 3$$

$$3=3 \quad \checkmark$$

$$x=-2 \quad \sqrt{-2+6} = -2$$

$$\sqrt{4} = -2$$

$$2 = -2$$

No!

$$2) \sqrt{x+1} + 5 = 0$$

$$\begin{array}{r} -5 \quad -5 \\ \hline (\sqrt{x+1})^2 = (-5)^2 \end{array}$$

$$\begin{array}{r} x+1 = 25 \\ -1 \quad -1 \\ \hline x = 24 \\ \text{reject} \end{array}$$

Check:

$$x=24 \quad \sqrt{24+1} + 5 = 0$$

$$\sqrt{25} + 5 = 0$$

$$5 + 5 = 0$$

$$10 = 0$$

No!

No Soluti

$$3) (\sqrt{2-x})^2 = (x)^2$$

$$2-x = x^2$$

$$\begin{array}{r} 2-x \\ -2+x \\ \hline 0 = x^2+x-2 \end{array}$$

$$0 = (x+2)(x-1)$$

$$\begin{array}{l|l} x+2=0 & x-1=0 \\ \hline x=-2 & x=1 \\ \text{reject} & \checkmark \end{array}$$

$$x=1$$

$$4) \frac{x}{2} = 2\sqrt{2x-3}$$

$$\left(\frac{x}{2}\right)^2 = (2\sqrt{2x-3})^2$$

$$\frac{x^2}{4} = 4(2x-3)$$

$$x^2 = 4(2x-3)$$

$$x^2 = 8x-12$$

$$x^2-8x+12=0$$

$$(x-6)(x-2)=0$$

$$x=6 \quad x=2$$

$$\checkmark \quad \checkmark$$

$$x=2, 6$$

$$5) \sqrt{2x-4} = x-2$$

$$6) \sqrt{x+1} = x-1$$

$$7) \sqrt{x+6} + x = 6$$

$$8) \sqrt{x+3} = 3-x$$